Docket No.: 50024-015 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Customer Number: 20277
Akiyoshi MIKAMI	:	Confirmation Number: not yet assigned
Serial No.: not yet assigned	:	Group Art Unit: not yet assigned
Filed: August 7, 2003	:	Examiner: not yet assigned

For: INORGANIC ELECTROLUMINESCENT DEVICE AND METHOD OF FABRICATING THE SAME

INFORMATION DISCLOSURE STATEMENT

Mail Stop DD
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In accordance with the provisions of 37 C.F.R. 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the documents listed on the attached form PTO-1449. It is respectfully requested that the documents be expressly considered during the prosecution of this application, and that the documents be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is being filed within three months of the U.S. filing date OR before the mailing date of a first Office Action on the merits. No certification or fee is required.

To ensure that these references are available to the Examiner we are providing copies.

Serial No.: not yet assigned

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Partial Translation of The extended abstracts of

The 49th Meeting, March 2002 of

The Japan Society of Applied Physics

Fabrication of MgS:Eu reddish emitting electroluminescent devices by rf-sputtering technique

...omitted...

【Object】 For the object of seeking a novel red fluorescent thin film suitable for an inorganic EL emitting layer, a MgS:Eu-based alkaline earth sulfide-based thin layer was prepared by RF sputtering to evaluate its crystallinity and luminous characteristics.

【Experimentation and Results】 First, MgS:Eu was selected as a reddish color emitting layer and prepared by 4"-size RF magnetron sputtering system. The film was formed at a substrate temperature of 200-300℃ in argon gas, through the use of a mixed and annealed powder of MgS and EuS as a target material. The EL device has a stacked structure of a MgS:Eu light emitting layer and a nitride based composite insulating layer. In addition, after the MgS:Eu film was formed, it was annealed at a temperature of 600° C for one hour in vacuum. Fig. 1 shows

the X-ray diffraction patterns of the MgS:Eu thin film and the source material. With respect to the MgS powder, the diffraction derived from (111), (200), (220) was observed, and the film was strongly orientated to a <100> direction. Fig. 2 shows PL and EL spectra of MgS:Eu film. The peak wavelengths are, in both spectrum, in the range of 590-595nm, where emitted light exhibited reddish orange color. So far, a luminance of L_{40} = 300cd/m^2 has been obtained by a pulse drive of a frequency of 1 kHz. The luminous characteristics of multiple high-color purity red EL devices will be also reported in the meeting.

...omitted...

INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(PTO-1449)

ATTY. DOCKET NO.	SERIAL NO.
50024-015	**not yet assigned**
APPLICANT: **Akiyoshi MIKAMI**	
FILING DATE: **August 07, 2003**	GROUP: **not yet assigned**

U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	CITE NO.	Document Number Number-Kind Code2 (if known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US	5,700,591	12/23/1997	Okajima et al.	
		US	4,717,858	01/05/1988	Tanaka et al.	
		US	4,727,004	02/23/1988	Tanaka et al.	

FOREIGN PATENT DOCUMENTS

EXAMINER'S INITIALS	CITE NO.	Foreign Patent Document Country Code3 -Number 4 -Kind Codes (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Figures Appear	Translation	
						Yes	No
		JP 3-266393(counterpart US 5,700,591 listed above)	11/27/1991				
		JP 62-12093(counterpart US 4,717,858 listed above)	01/21/1987				
		JP 62-122096(counterpart US 4,727,004 listed above)	06/03/1987				
		JP 62-225583(counterpart US 4,727,004 listed above)	10/03/1987				
		JP 63-995(counterpart EP 0249942 listed below)	01/05/1988				
		EP 0 249 942(with English abstract is counterpart to JP 63-995 listed above)	12/23/1987	Toyo Soda Manufacturing Co., Ltd.			
		JP 64-027194(with English abstract)	01/30/1989	NEC Corp.		X	
		JP 2001-118677(with English abstract	04/27/2001	TDK Corp.			
		JP 01-243391(with English abstract)	09/28/1989	Tosoh Corp.			
		JP 02-148595(with English abstract)	06/07/1990	NEC Corp.		X	
		JP 04-094094(with English abstract)	03/26/1992	Tosoh Corp.			

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER'S INITIALS	CITE NO.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		Red Electroluminescence from MgS:Eu and $Mg_{1-x}Ca_xS$:Eu Thin Film Phosphors preapred by RF-Sputtering Technique, Akiyoshi Mikami et al. Ishikawa, Japan, pp. 1 - 3	
		Fabrication of MgS:Eu reddish orange emitting electroluminescent device by rf-sputtering technique, The 49th Meeting, March 2002 of The Japan Society of Applied Physics, (with Translation)	

EXAMINER	DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

29p-YF-10　高周波スパッタ法によるＭｇＳ：Ｅｕ赤色系無機ＥＬ素子

Fabrication of MgS:Eu reddish orange emitting electroluminescent devices by rf-sputtering technique

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【目的】無機ＥＬ発光層に適した赤色蛍光体薄膜の新規探索[1]を目的とし、MgS:Eu をベースとしたアルカリ土類硫化物系薄膜を高周波スパッタ法により作製し、結晶性および発光特性について評価した。

【実験および結果】赤色系発光層として、まず MgS:Eu を選択し、4" サイズ高周波マグネトロンスパッタ装置より作製した。ターゲット材料には MgS と EuS 粉末を混合および焼成したものを用い、アルゴンガス中、基板温度 200～300℃で成膜した。ＥＬ素子は MgS:Eu 発光層と窒化物系複合絶縁層の積層構造とした。なお、MgS:Eu 膜は成膜後に 600℃、1 時間、真空中で熱処理を行った。図１にソース材料と MgS:Eu 薄膜のX線回折パターンを示す。MgS 粉末は(111)、(200)、(220)からの回折が認められるが、薄膜化により<100>方向に強く配向した。図 2 に MgS:Eu 膜のＰＬおよびＥＬスペクトルを示す。いずれのスペクトルにおいても、ピーク波長 590～595nm の範囲にあり、発光は赤橙色を示した。現状では周波数 1 kHz のパルス駆動において輝度 L_{10}=300cd/m²が得られている。講演では多元化による高色純度赤色ＥＬ素子の発光特性についても報告する。

1) A. Mikami, K. Yamamoto, AD/IDW' 01, p. 1135 (2001).

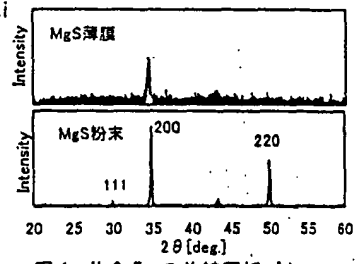

図１　MgS:Eu の X 線回折パターン

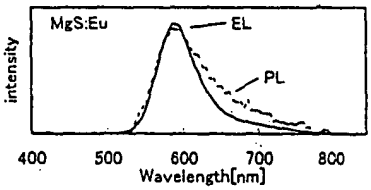

図２　MgS:Eu 膜の PL、EL スペクトル